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Nonlethal Technologies—Worldwide (U)

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NONLETHAL INFORMATION EFFECTORS WORLDWIDE

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Introduction

(C/NF) [redacted]

(U) Computer viruses are another unconventional disabling effect, already alarmingly demonstrated by hackers, both domestic and international. The information warfare technologies addressed in this section, i.e., computer viruses/malicious codes, information distortion, and surreptitious insertion loom as some of the greatest potential threats to a digitized, information-based modern army. Undetected, such weapons could disrupt tactical or even national defense mechanisms of a computer-dependent infrastructure.

(U) Increasing concentration of information in computers, computer systems, and networks that support command, control, communications, intelligence, and other military applications has made information technology a competitive weapon of unparalleled power and importance. At the same time, the utilization of information technology has made possible the compromise or corruption of critical information and the disruption of information services.

(U) Both electronic intrusion into computers and networks and the use of malicious software (computer viruses, Trojan horses, worms, logic bombs, and the like) have the capability to supply an adversary with the data, modify and manipulate data, or disrupt operation of computer systems.

Electronic Intrusion

(U) Experts have assessed that computers with network connectivity or dial-up access can be entered by an electronic intruder from anywhere in the world. Gaining access to these computers through a network connection is relatively simple, costs very little, and typically involves little risk of detection. Information on systems and networks is readily available from a variety of sources, including professional journals, textbooks, and computer bulletin boards. Information about operating system vulnerabilities is frequently provided in publications of the computer underground. Many intruders are familiar with phone company equipment and software.

(U) In general, to access an automated information system, an intruder must obtain system user identification and passwords. These may be provided by legitimate users (intentionally or unintentionally), found by testing common or logical passwords, or through use of certain software tools. The intruder then attempts to identify and take advantage of known vulnerabilities in the hardware, software, or system operation. Once an intruder has gained access to a system of interest, he may install a trap door—a software mechanism that permits system protection to be circumvented and allows the intruder to reenter the system undetected.

(FOUO) Once an intruder obtains a valid password/ID, he can masquerade as a legitimate user. If the intruder can access the account of a system administrator or system programmer, he can grant himself "superuser" privileges allowing him to modify or delete

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[redacted]

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Figure 21. Airborne Information Distortion

programs, data, index tables, and legitimate user privileges. In addition, he can then alter the audit trail to hide his presence. When inside the system, the intruder has the opportunity to modify data or programs.

~~(S/NF/WN)~~ Intruders often share information through electronic bulletin boards (BBS), electronic computer magazines (ECM—sometimes called phracks), and other publications of the computer underground. BBS and ECM provide tips and techniques on computers, operating systems, passwords, computer addresses, hacking, data encryption and decryption, telephone systems, and manipulating the telephone system (phreaking). Similar information is frequently available in mainstream computer publications as well. One phrack even contained information on the data encryption standard (DES). DES, a complex nonlinear ciphering algorithm is one of the most frequently used encryption methods (figure 22).

~~(S/NF/WN)~~ Defense and defense-related computers have been subject to intrusions of this type on a number of occasions:

- Over a period of several years (ending with their arrests in March 1989), a group of former West Germans now referred to as the "Hannover hackers" used telephone lines from Karlsruhe and Hannover to access over 250 computer systems. These included databases or networks hosted by at least 90 US defense or defense-related facilities. [redacted]

- According to press reports, Dutch teenagers gained access, apparently through an INTERNET connection, to computer systems at 34 DoD sites (including the Air Force Weapons Laboratory, the David Taylor Research Center, the Army Information Systems Command, and the Navy Ocean Systems Center) during Operations Desert Shield/Storm. They were snooping in sensitive rather than classified military information. The intrusions normally involved broad-based keyword searches including such words as "rockets," "missiles," and "weapons." They exploited a trap door to permit future access and modified and copied military information to unauthorized accounts on US university systems. Although no "customer" was identified, the data collected by this group could have been sent electronically anywhere in the world.

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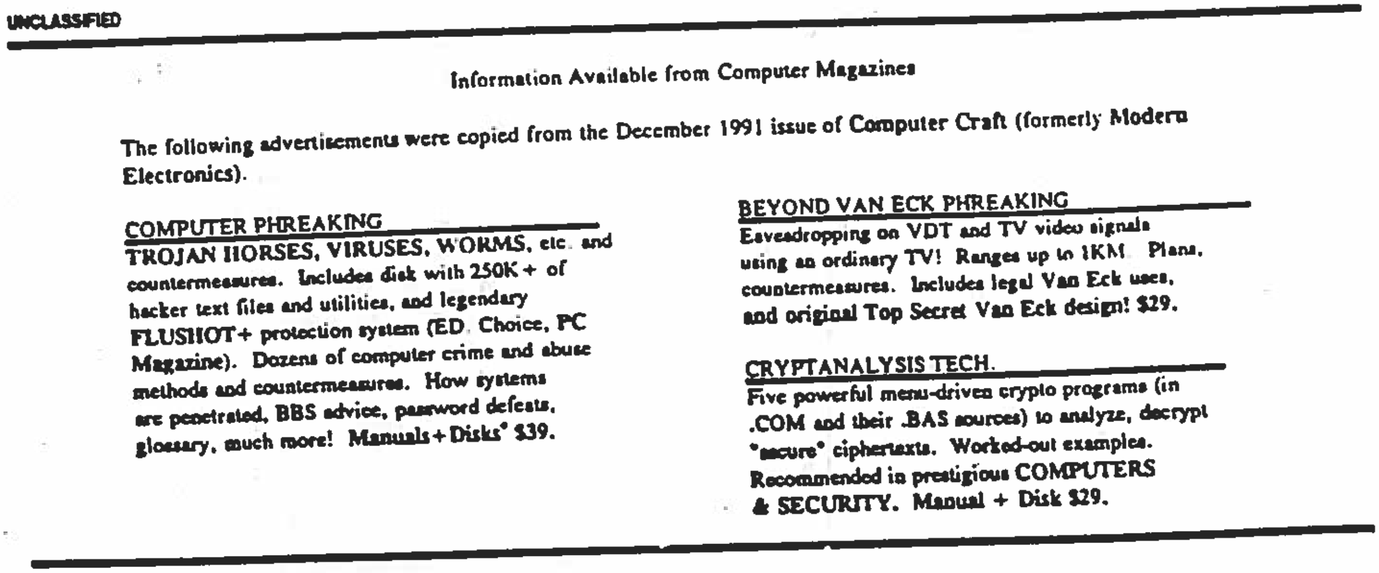

Information Available from Computer Magazines

The following advertisements were copied from the December 1991 issue of Computer Craft (formerly Modern Electronics).

COMPUTER PHREAKING

TROJAN HORSES, VIRUSES, WORMS, etc. and countermeasures. Includes disk with 250K+ of hacker text files and utilities, and legendary FLUSHOT+ protection system (ED. Choice, PC Magazine). Dozens of computer crime and abuse methods and countermeasures. How systems are penetrated, BBS advice, password defeats, glossary, much more! Manuals+Disks* $39.

BEYOND VAN ECK PHREAKING

Eavesdropping on VDT and TV video signals using an ordinary TV! Ranges up to 1KM. Plans, countermeasures. Includes legal Van Eck uses, and original Top Secret Van Eck design! $29.

CRYPTANALYSIS TECH.

Five powerful menu-driven crypto programs (in .COM and their .BAS sources) to analyze, decrypt "secure" ciphertexts. Worked-out examples. Recommended in prestigious COMPUTERS & SECURITY. Manual + Disk $29.

Figure 22. Advertisements for Virus, Worms, etc.

- An unauthorized user entered several systems at Lawrence Livermore National Laboratory in early December, 1988, using a vulnerability in the file transfer protocol of UNIX to achieve system manager status. This allowed him access to six Sun workstations and VAX machines. Although the intrusion was detected, officials are not sure what the hacker did because he removed and altered audit records. He did not appear to be after any particular information but seemed to be interested only in breaking into new systems. The hacker used the INTERNET and routed his calls through computers in several universities including Stanford, the University of Washington, and a research laboratory in New Jersey.
- In June 1992, British authorities arrested a group of hackers in the United Kingdom. Data retained by the hackers included information on computers in New Zealand, Belgium, Finland, and other countries; password files from various computers; and transcripts of "chat" sessions between themselves and other hackers. Although the full extent of their activities is still unclear, a review of information to date indicates that the hackers accessed the following computers:
  - □ [redacted]
  - □ [redacted]
  - □ [redacted]
  - □ [redacted]
  - □ [redacted]

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~~(S/NF)~~ Electronic intrusion is a significant and growing threat. An intruder can obtain access to systems through network interconnectivity from virtually anywhere in the world because of the interconnection of the public telephone system and military and civil communication systems. The collective skill set or unauthorized users is high. The globalization of network connections and the availability of information about how to conduct attacks allows this skill set to be widely shared. In addition to providing an avenue for attack, network connectivity also provides a means by which attacks can be coordinated. Foreign Intelligence Services (FIS) clearly are interested in the skills required to access automated information systems; they may be interested in the hackers themselves as well. While individuals operating independently represent primarily nuisance threats, the orchestration of groups of unauthorized users is potentially very serious.

Malicious Software

(U) Malicious software is software that is engineered to cause a computer to act in a manner other than that intended by its users and includes such programs as Trojan horses, logic bombs, worms, trap doors, bacteria, computer viruses, password traps, and others (figure 23). Examples include software designed to circumvent security systems, illicitly access data or processors, cause damage to computing systems or machinery controlled by them, modify or destroy data, or initiate processes or actions unintended by the computer operator. Malicious software can cause loss of productivity, system interference or lockup, corrupted files, loss of data, unreliable applications, or even system crashes. Eradicating the code can cost an organization hundreds of thousands of dollars, both in terms of lost data and the time it takes to recover from a malicious software attack. If the attack occurs during a critical military operation, the results could be deadly.

(U) Malicious software is already pervasive throughout the world and the capability for its production is growing. Although there have been no verified incidents of deliberate use of malicious software against the United States by an adversary, it could, and may in the future, be targeted against communications, transportation, banking, power, and computation systems upon which both industry and the military might depend. While viruses are far more prevalent than Trojan horses, worms, or logic bombs, the latter have the potential to do far greater damage. They are harder to detect and are generally written by more expert programmers with specific goals in mind.

~~(C)~~ Many foreign countries have been the source of malicious software [redacted] The country of origin, however, is not always apparent because, for

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(S-NF[redacted]

(S-NF) [redacted]

Source[redacted]

Figure 23. Remote Insertion of Malicious Software

example, a computer virus can propagate through any number of computer systems before it is discovered. It is not surprising then that documented evidence of actual malicious code introduction by FIS or military is not available. An adversary would not be willing to expose such a capability during peacetime. There has been evidence of FIS intent to introduce computer viruses, however.

~~(S/NF/WN~~) Prior to the August 1991 coup attempt, the KGB was developing computer viruses with the intent of using them to disrupt computer systems during times of war or crisis. In early 1991, a highly restricted project was undertaken by a group within the Military Intelligence Directorate of Cuba's Ministry of the Armed Forces. The group was instructed to obtain information to develop a computer virus to infect US civilian computers. The group spent about $5,000 to buy open-source data on computer networks, computer viruses, SATCOM, and related communications technology. Details of this specific endeavor are not known, however, the point is that such efforts continue to be made and could potentially cause irreparable harm to any nations' defense.

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~~(C)~~ The scope for the military use of malicious software, both strategically and tactically, is large, and as the offensive potential for this type of weapon becomes apparent, governments are more likely to become involved in malicious software research[redacted]

~~(C)~~ In addition to military targets, adversaries may target a country's infrastructure as well—public

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telecommunications, financial networks, power grids, transportation (air traffic control systems)—systems upon which government, industry, and military depend. Similarly, the adversaries may not be military or government groups but terrorist organizations, political/social activists, or commercial entities. No such groups have been specifically identified as having an interest in the use of malicious software or assessed to have the capability to use it. There are any number of permutations of motives, means, and targets that can be attributed to such groups, and because little is known about them, capabilities and intents are almost impossible to assess.

~~(S/NF)~~ The development of malicious software requires little in the way of resources—a few computers and an individual or group with the appropriate expertise—making a malicious software R&D program easy to support as well as easy to hide. Inserting the malicious software into the target system, however, is more problematic. Trusted insiders may have to be recruited or electronic intrusion methods attempted. [redacted]

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[redacted]

Net Assessment

(U) In addition to the information distortion possibilities of electronic transmissions to tactical systems, many other aspects of military command, control, communications, and intelligence (C3I) is controlled or influenced by computers. The reliance on computers, automated weapons, and other automated systems critical to the performance of military missions has grown tremendously in recent years and will continue unabated into the next century. Computer viruses and other malicious software are already pervasive throughout the world, and the capability for its production is growing. Probably every country in the world where there is a computer has been victimized at least once by malicious software, and more than 60 different countries have been identified as the source of at least one computer virus.

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